DOCUMENT RESUME

ED 260 795 PS 015 262

AUTHOR Golomb, Claire; Dunnington, Gordon
TITLE Compositional Development in Children's Drawings.
PUB DATE Jun 85
NOTE 13p.; Paper presented at the Annual Symposium of the Jean Piaget Society (15th, Philadelphia, PA, June 6-8, 1985).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Age Differences; Children; *Cognitive Development; *Developmental Stages; *Freehand Drawing; Performance Factors; Preadolescents; *Spatial Ability
IDENTIFIERS *Piagetian Theory

ABSTRACT

Data obtained under naturalistic conditions do not support the notion of a close fit between the growth of geometric concepts during the concrete operational period and "realism" in art. Realism here refers to the ability to portray the objective proportions of a figure, to coordinate spatial relations and distances, and to represent a scene in perspective. Participants were 161 children of predominantly middle-class background, ranging in age from 3 to 13 years. From six alternatives, four drawing themes were specified by the examiner, and their order of presentation was randomized: A Family, A Birthday Party, Children Playing, A Garden with Trees, Flowers, and a Pond. The tasks were administered on an individual basis or in small groups of 2 to 3 children. The Revised Compositional Scale (Golomb, 1983, 1984) was used to assess the spatial characteristics of the drawings and to identify compositional grouping principles. Where Piaget predicts a radical transformation in representational competence (perspective drawings), findings indicate some consolidation of skills and attention to specific aspects of figural differentiation, but spatial differentiation per se do not show the predicted transformation. Compositional strategies were found to be very much a function of the nature of the task and remained fairly simple for all ages and/or all tasks. The relationship Piaget proposed between drawing competence and spatial-geometrical constructs should be reassessed. (RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED260795

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Compositional Development in Children's Drawings

Claire Golomb and Gordon Dunnington

Department of Psychology

University of Massachusetts at Boston

Paper presented at the Fifteenth Annual Symposium of the Jean Piaget Society "Constructivism in the Computer Age." Philadelphia, June 6 to 8, 1985

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Claire Golomb

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PS 015262

Compositional Development in Children's Drawings

Most studies of children's drawings address relatively limited aspects of a drawing, for example, the construction of a single figure and its orientation (Goodnow, 1977), its schematic or realistic properties (Goodenough, 1926; Harris, 1963), and perhaps its spatial relation to another figure that stands in an "in front/behind" relation to it (Cox, 1981; Freeman, 1980; Light et al., 1980, 1981). The issue of compositional development, that is, the relationship that figures bear to each other and to the rest of the page, has received scant attention (Golomb & Farmer, 1983). In order to understand the fascination drawing holds for children, and the constraints as well as the possibilities of the pictorial medium for the communication of meaning, we have to study the development of compositional competence.

Two major approaches have dominated our thinking about child and adolescent art: Piaget's analysis of drawing in terms of the child's understanding of spatial relations, and the psychodynamic approach that stresses the latent content and symbolic meanings. For purposes of our presentation, we shall limit ourselves to the cognitive analysis proposed by Piaget (Piaget & Inhelder, 1956; Piaget, Inhelder & Szeminska, 1960).

Piaget locates the developmental progression of drawing within a clearly delineated time span. Its beginning can be traced to the prelogical period (early symbolic thought) while its end-point is "realism" or drawing in perspective.

The first stage in the representation of space reflects only a concern with the general property of "boundaries", an object's quality of being "bounded", and thus it ignores the sizes and

shapes of objects. Accordingly, the first general quality to be represented in drawing is the closed shape. At the most elementary level, the rules of proximity and separation of elements yield figure-ground relations, best exemplified in the form of a closed circle (Figure 1). At this stage the child cannot yet draw or copy a square or a triangle. The rounded shapes drawn by 3 and 4 year olds are based on the topological relations of proximity versus separation from which the quality of openness versus closure is derived. With the addition of a principle of order, some degree of spatial succession and symmetry, i.e., the sequential arrangement of parts, is attained as illustrated in the orderly depiction of facial features (Figure 2). The rule of enclosure further differentiates between the inside and the outside of the figure, for example, eyes are drawn on the inside of the contour and ears on the outside of the boundary (Figure 3). The last principle to complete this stage of drawing development is that of continuity. This principle insures that body parts are attached (Figure 4).

Of these relationships, proximity is the most primitive one since it does not imply any ordering of parts. When proximities become ordered, they are at first quite imprecise, as demonstrated in the wrong attachment of arms to the head (Figure 5). Ordering requires an act of mental representation and during the first stage, approximately ages 3 and 4 years, the child's limited analysis of the elements that constitute a figure, and his equally poor attempts to synthesize them yield defective representations which Piaget, following Luquet (1913, 1927), labels synthetic incapacity. It is a representatin of space that is ignorant of

euclidean relations of proportion, length, distance and shape, and unconcerned with the projective relations of perspective.

The next stage, which extends between ages 4 to 7-8 years, is characterized by Piaget as intellectual realism. Topological principles still predominate and, in the case of complex objects, they yield representations that largely ignore shape, size, and proportion (see examples of human and animal figures). However, in simple shapes, Piaget observes the emergence of euclidean and projective relations, for example, in the copying of a square at 4 years, a triangle at 5 years, a diamond at the age of 6 or 7 years. The drawings begin to employ straight lines and angles. However, according to Piaget, the object is still distorted in the drawing, and the child's representation of space reflects only a primitive level of understanding, a concern with relations that are merely internal to a figure. At this stage, the drawing indicates a crude form of correspondence to its model, without coordination of projective and metric relations. Piaget defines these drawings in terms of a set of conspicuous "errors", for example, transparencies that depict in the same space inside and outside aspects of an object (a house drawn in frontal view with its inhabitants and furniture showing through; a mother with a fetus in her womb). Other errors include mixed views, e.g., a body drawn in frontal view with a profile head, fold-out drawings in which, for example, a wagon is drawn as a square with its wheels rotated into the horizontal plane, the persistent tendency to arrange figures side-by-side which ignores the depth relation and does not use the vertical dimension for the depiction of near-far relations, and, finally, the failure to use occlusion to

indicate that one object stands behind another one that partially obscures its view. All these faults and many more, Piaget attributes to an inability to draw what the child actually sees. Instead of drawing what he sees, the youngster draws what he knows, i.e., what he understands of the objects and their relationship, and this limited and somewhat distorted understanding Piaget, as we have already indicated, terms intellectual realism. This term, with its emphasis on knowledge, refers to the child's inability to depict the object from the particular viewing position he happens to occupy. Intellectual realism is contrasted with visual realism, the ability to depict the object realistically, as it appears to the viewer from a particular station point.

The final stage Piaget discusses is visual realism. It emerges during the period of concrete operation reasoning, and Piaget links the development of logical operations to the growth of spatial-mathematical reasoning and the ability to coordinate perspectives, proportions and distances in drawing. During this period, drawings come to respect euclidean and projective relations, they conserve straight lines, angles, curves and distances through various transformations. Drawings become realistic and respect the viewpoint of the observer which, from the age of 9 years, yield correct perspectives.

How well have Piaget's formulations which emphasize a close relationship between stages in the evolution of geometric constructs and of drawing systems stood the test of time? We shall present a set of data, obtained under naturalistic conditions, that do not support the notion of a close fit between

the growth of geometric concepts during the concrete operational period and "realism" in art. Realism, in the context we are discussing, refers to the ability to portray the objective proportions of a figure, to coordinate spatial relations and distances, and to represent a scene in perspective. We shall pay close attention to age effects and look for the predicted changes in perspective drawings around the age of 9 years. We shall also examine task effects and determine the extent to which compositional strategies derive from the child's general spatial conceptions or from the nature of the drawing task.

Methods

Subjects

Our participants were 161 children of predominantly middle-class background, ranging in age from 3 to 13 years.

Materials

Manila paper, 18"x12" and standard sets of crayons or colored pens.

Tasks and Procedures

Four drawing themes were specified by the examiner and their order of presentation was randomized: Draw a Family, A Birthday Party, Children Playing, A Garden with Trees, Flowers and a Pond. The tasks were adminstered on an individual basis or in small groups of 2 to 3 children.

Assessment Instrument

The Revised Compositional Scale (Golomb, 1983, 1984) is an ordinal scale designed to assess the spatial characteristics of a drawing, i.e., its degree of spatial differentiation in terms of up-down and near-far relations and to identify compositional

grouping principles, for example, proximity, alignment, and symmetry that portray relations among figures and between the figures and the spatial surround. Each drawing was classified in terms of these attributes and also assigned a quantitative score.

Results

Age Effects

The ordinal scores assigned to the compositional categories showed a steady increase with age and a correlational analysis yielded statistically significant results for the total age range (3.0-12.11, r_s =.60). Thus, the ability to depict spatial differentiation and to organize the figures showed a progressive improvement with development. The relation between age and compositional scores, however, was not strictly linear, and when correlations were separately computed for three age groups, the results were statistically significant for ages 3.0-5.11 (r_s =.58) and for 6.0-8.11 (r_s=.29), but not significant for ages 9.0-12.11. By 9 years, age is no longer a good predictor of compositional achievement as measured by our scale. This trend was further confirmed by a series of paired comparisons using the Mann-Whitney U Test to compare the achievements of successive age groups. Adjacent age groups were combined to increase the size of the sample which yielded five groups[1]: Group 1, 4.0-5.11; Group 2, 6.0-7.11; Group 3, 8.0-9.11; Group 4, 10.0-11.11, Group 5, 12.0-12.11. Successive comparisons yielded significant differences on all four tasks for groups 1 and 2, and groups 2 and 3; the comparisons for groups 3 and 4 were not significant, and for groups 4 and 5 significant on only two tasks. This finding is quite congruent with the correlational analysis and suggests that

spatial differentiation reaches a plateau at approximately age 9 years. The finding that the greatest gains in spatial differentiation occur prior to age 9 and that they tend to level off for ages 9-13, does not suggest a close fit with the achievements in logical reasoning which Piaget attributes to this period of concrete operational thought. Where Piaget predicts a radical transformation in representational competence (perspective drawings) we find some consolidation of skills and attention to specific aspects of figural differentiation (detail, orientation, gesture), but spatial differentiation per se does not show the predicted transformation.

Task Effects

Statistically significant task effects were obtained for each one of the five age groupings using a Friedman Two Way Analysis of Variance ($p's < .05$). The results indicate that compositional strategies are very much a function of the nature of the task. On some tasks, for example, Draw a Family, a fairly primitive strategy was commonly used, aligning the figures horizontally across the page, without clarification of the spatial characteristics of the scene, and without establishing a relationship among the figures (Figures 6,7,8). This finding held true for almost all ages. Altogether, we noted that the compositional strategies for all ages and for all tasks remained fairly simple, demonstrating a powerful horizontal alignment effect that proved to be the most widely adopted grouping principle (Figures 9,10,11,12,13,14). We found no attempts to represent perspective or to foreshorten figures, and few efforts to employ occlusion strategies. The preference for canonical

orientations and for orthographic views was maintained throughout this age range, and we continue to see many mixed views of objects. We observe a concern for greater detail, the use of more realistic color, and some improvement in the proportion of a figure, but overall the spatial-representational framework remains oblivious to depth cues, does not take the viewing position of the observer into account, and does not use rules of perspective.

Summary and Conclusions

The data indicate that age effects level off on all four tasks when, according to Piaget's prediction, we should find a radical increase in the use of realistic, perspectival representations. The findings call for a reassessment of the relationship Piaget proposed between drawing competence and spatial-geometrical constructs. The popular notions of intellectual and visual realism have little explanatory power, and prove unsatisfactory for gaining an understanding of drawing development. Piaget did not develop a theory of pictorial representation, rather he dealt with the representation of space as a single domain where drawing, copying and mathematical reasoning are closely linked to a cognitive structure. Assuming a far-reaching correspondence across intellectual domains, Piaget borrowed Luquet's formulations and wedded them to his analysis of spatial concepts.

In the light of our study as well as other data (Arnheim, 1974, Gardner, 1983) we ought to consider the graphic medium as a separate domain, with its own unique properties and rule-systems. A developmental analysis of drawing will have to derive its laws from this medium, and it is a task for the future to determine

relationships between the graphic domain and the cognitive operations described by Piaget.

Notes

1. Since many of the 3 year olds produced scribbles on all or some of the tasks, inclusion of their scores (frequently 0) tended to distort the developmental trends. The data derived from the 3 year olds were therefore eliminated from further analyses.

References

Arnheim, R., (1974) Art and Visual Perception. Berkeley: University of California Press.

Cox, M. (1981) One thing behind another: Problems of Representation in children's drawings. Educational Psychology, 1, (4), 275-287.

Freeman, N.H. (1980) Strategies of Representation in Young Children. New York: Academic Press.

Gardner, H. (1983) Frames of Mind: The Theory of Multiple Intelligences. New York: Basic Books.

Golomb, C. & Farmer, D. (1983) Children's graphic planning strategies and early principles of spatial organization in drawing. Studies in Art Education, 24, (2), 86-100.

Light, P. H. & MacIntosh, E. (1980) Depth relationships in young children's drawings. Journal of Experimental Child Psychology, 30, 79-87.

Luquet, G. H. (1913) Les Dessins d'un Enfant. Paris: Alcan.

Luquet, G. H. (1927) Le Dessin Enfantin. Paris: Alcan.

Piaget, J. & Inhelder, B. (1956) The Child's Conception of Space. London: Routledge, Kegan Paul.

Piaget, J., Inhelder, B., Szeminska, A. (1960) The Child's Conception of Geometry. London: Routledge, Kegan Paul.